Salvo, the Rodanthe area and finally the northern end of Pea Island. Inlets in these areas would all affect traffic flow along Highway 12, the main transportation route along the Outer Banks.

Beyond simple inlet formation, it is now understood that areas with very high inlet potential also have the potential to erode catastrophically to the point of barrier island collapse; that is, the erosion below sea level of long segments of the barriers (Culver et al., 2007). The collapse of portions of Dauphin Island, Alabama and the Chandeleur Islands, LA following the impacts of hurricanes Ivan and Katrina are modern examples of what could happen to segments of the Outer Banks (http://coastal.er.usgs.gov/hurricanes/katrina/lidar/dauphin-island.html) (Fig.21). As sea level rises, a barrier island will respond either by migrating landward across the underlying substrate or by disintegrating if there is not sufficient sand volume to maintain relief above sea level (Sallenger, 2000). As storms occur more frequently, or with more intensity, the process of inlet creation and barrier disintegration or collapse may proceed more quickly. Based on geologic evidence, Riggs and Ames (2003) suggest that large portions of the Outer Banks of North Carolina could disappear within the next several decades if sea level continues rising at the current rate or if one or more major hurricanes were to directly impact the Outer Banks (Fig. 22). Similar collapse occurred approximately 1,000 years ago during the warm climatic interval known as the Medieval Warm Period (Culver et al., 2007). Given the importance of barrier islands as coastal landforms, changes in barrier island morphology, especially the possible increase in inlet activity and disintegration or collapse of barriers altogether, would have serious socio-economic implications. Understanding and predicting the response of coastal systems and landforms to sea-level rise and climate change is critical for effective coastal planning and to develop management efforts that can adapt to rising sea level and increased storm activity, as evidenced by the recent Hurricane Katrina disaster.

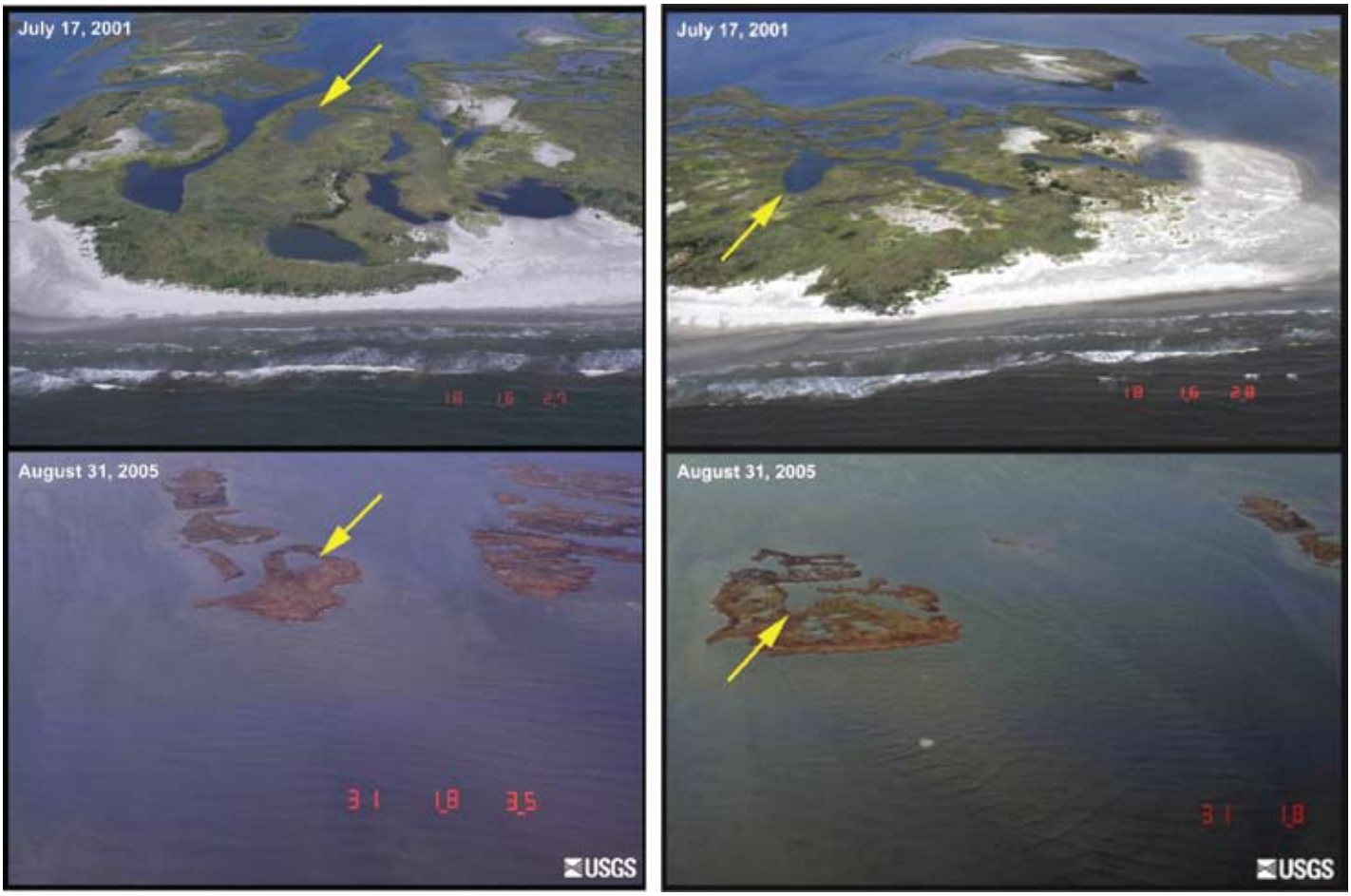

Figure 21. Photographs showing portions of the Chandeleur Islands, LA before and after Hurricane Katrina. The top photographs are from July 17, 2001, before the hurricane. The bottom two photographs are from August 31, 2005, two days following Hurricane Katrina. The yellow arrows point to the same location in each photographic pair (http://coastal.er.usgs.gov/hurricanes/katrina/photo-comparisons/chandeleur.html).